

ANALYSING AND FORECASTING THE UNDEREMPLOYMENT TREND IN MALAYSIA

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ABSTRACT

In this paper we aim to examine and forecast the underemployment trend in Malaysia. We primarily focus on two measurements of underemployment which are time-related and skill-related underemployment for a period of ten years starting from 2005 to 2015. To forecast the number of time-related and skill-related underemployment for 2016 we use exponential smoothing forecast method. The data and other information related to underemployment in Malaysia are collected from Department of Statistics, Malaysia. The study found that although the proportion of time-related underemployment over employment is relatively stable during the ten years period, the number of skill-related underemployment is increasing by years. Females are mostly affected by both time-related and skill-related underemployment.

Keywords: Underemployment, unemployment, trend, Malaysia, forecasting, productivity

1.0 INTRODUCTION

Malaysia has enjoyed one of the best economic growth records in Asia over the last four decades. The economy managed to achieve a stable real GDP growth of 6.2% per annum since 1970, successfully transform Malaysia from an agriculture-based economy in the 1970s, to manufacturing based economy in the mid-1980s, and to modern service based economy in the 1990s. Malaysia rose from the rank of a low-income economy in 1970s to a high middle-income economy in 1992 and remains so today (Economic Planning Unit, 2015). With a target of average 5 to 6% economic growth per annum Malaysia aspires to achieve an advanced economic status by 2020. To materialize this aim, six strategic thrusts have been outlined in the Eleventh Malaysia Plan so as to help Malaysia facing the challenges and opportunities waiting ahead. The six thrusts are: enhancing inclusiveness, improving wellbeing for all, accelerating human capital

development, pursuing green growth, strengthening infrastructure, and re-engineering economic growth for greater prosperity.

Pursuing the high income nation target, one of the focuses in The Eleventh Malaysia Plan is to accelerate human capital development which is comparable to an advanced nation. Human capital development is a critical enabler for driving and sustaining Malaysia's economic growth. An efficient and effective labor market is important to attract investments and provide opportunities for everyone to participate in and enjoy the benefits of economic growth. It is also critical to ensure the match between supply and demand, minimize underutilization of skills, and enable inclusive and sustainable growth (Economic Planning Unit, 2015). During the previous Tenth Malaysia Plan, Malaysia managed to succeed to achieve the full employment at the fluctuation of 2.9% to 3.1% unemployment rate in 2014 and 2015 respectively (Department of Statistics Malaysia, 2015), which was below the natural rate of unemployment of 4%. It was one of the highlights of the achievements of Tenth Malaysia Plan in creating more jobs and maintaining the full employment. Even though the economy continues to be in full employment, there are many underlying issues on labor forces that are not captured by unemployment rate. Unemployment rate alone cannot comprehensively cater the scenario of labor underutilization or underemployment as underemployment has been emphasized in the international labor market issues (International Labour Organization, 1998). Underemployment is a broad concept reflecting underutilization of the productive capacity of the employed population (Mehran, Bescond, Hussmanns, & Benes, 2008).

Underemployment in general is defined as the situation when workers' jobs do not use all their skills, education, or availability to work. Underemployments are basically measured in terms of time-related and skill-related underemployment. Time-related underemployment usually occurs when employees who are working fewer hours than is typical in their field despite the fact that they are willing and capable to work more hours, but cannot get full-time employment. On the other hand, skill-related underemployment occurs when workers are in full-time jobs that do not use all their skills. In other words, workers are in full time jobs that do not match their skill or qualifications. According to Department of Statistics, Malaysia (DOSM, 2015), underemployment occurs when persons who, at any time during the reference week worked at least an hour for pay, profit or family gain; were employed less than 30 hours a week during the reference week because of the nature of their work or due to insufficient work and are able and willing to accept additional hours of work.

On the international level, time-related underemployment exists when the hours of work of a person are insufficient in relation to an alternative employment situation in which the person is willing and available to engage. According to the definition of International Labour Organization

(ILO: 1998), persons in time-related underemployment comprise all those in employment that satisfy the following three criteria:

- a) were willing to work additional hours (i.e. wanted another job (or jobs) in addition to their current job (or jobs) to increase their total hours of work; to replace any of their current jobs with another job (or jobs) with increased hours of work; to increase the hours of work in any of their current jobs; or a combination of the above);
- b) were available to work additional hours (i.e. were ready, within a specified period of time, to work additional hours, given opportunities for additional work); and who
- c) worked less than a threshold relating to working time (i.e. persons whose hours actually worked in all jobs during the reference period were below a threshold to be specified according to national circumstances)

Mehran *et al.* (2008) described two particular categories of persons in time-related underemployment, which are: i) persons who usually work part-time schedules and want to work additional hours, and ii) persons who during the reference period worked less than their normal hours of work.

In addition to time-related underemployment, countries may identify employees in other inadequate employment situations due to low income, inadequate use of skills and excessive hours (ILO, 2013). According to Hussmann (2007) and Mehran *et. al.* (2008) skill-related underemployment occurs when employees want or seek to change current work situation in order to use their current occupational skills more fully, and being available to do so. It may also be referred to as over qualification or over education, the employment of workers with high education, skill levels or experience in jobs that do not require such abilities. There are few studies available on this topic particularly in the case of developed nations. Most of the previous studies revealed that time-related and skill-related underemployment is higher in females than males (Campbell, Parkinson, & Wood, 2013; Li, Duncan, & Miranti, 2015; Shahril, 2015; Wilkins, 2004) with the exception of the study of Sugiyarto (2007) who showed that underemployment is significant among males. ILO has been calling long its members to address the issue of underemployment together with unemployment with a view to stimulate economic growth and development, raising levels of living, meeting manpower requirements and overcoming unemployment and underemployment (ILO, 1998). In its Convention No. 122 of 1964, which is ILO's principal standard on employment policy, calls on members to ensure that "there is: (i) work for all who are available for and seeking work; (ii) such work is as productive as possible; and (iii) there is freedom of choice of employment and the fullest possible opportunity for each worker to qualify for, and to use his skills and endowments in, a job for which he/she is well suited, irrespective of race, color, sex, religion, political opinion, national

extraction or social origin” (ILO, 1998). Situations which fail to meet (i) are related to unemployment, and those which do not meet (ii) are related mainly to underemployment. However, full employment policies in a country have mainly targeted the reduction of unemployment (ILO, 1998). Many workers around the world tend to work less hours, earn less income or use their occupational skills incompletely; situations related to underemployment. In other words, they tend to carry out an activity which is less productive than they could and would like to carry out (Greenwood, 1999).

Unemployment rate is criticized because of its inability to capture all types of labor market downturns. Mehran et al. (2008) argued that response to economic downturn may be different in different areas. Employers facing economic downturn in an area with a comprehensive unemployment scheme may lay-off or reduce number of employees to cut cost. A downturn in another area with limited unemployment insurance coverage may resort to another option – for example work sharing or reduction of hours of work and wages. A similar economic downturn in two different areas results in an increase of unemployment rate in one area and no change in another. In developing countries, rate of unemployment is generally low, and in particular lower than in industrialized countries. There are no unemployment benefits or social scheme to be claimed; hence most people cannot afford to be unemployed for a long period of time. They are willing to take any kind of job to support themselves. Thus unemployment rate cannot be used as a measure of economic well-being of the people; or as an indicator that people’s aspiration for work are largely met (Sengenberger, 2011). Besides, unemployment rate is not affected by variations in the extent to which both the time and skills of employed labor are used for economic development. A person may be employed but his or her potential is not optimized; be it in terms of pay, hours, skill level, education, and experience. The employee is not given the chance and responsibilities to fully utilize his/her capacity. They lost the opportunity to fully participate in the labour market and accumulate financial, wealth and personal benefits.

Measuring labour underutilization is important for two reasons: first, labor is a productive input that cannot be stored and should not be wasted; and second, ownership of productive inputs determines income, and many people in developing countries have only labor as their income source (Sugiyarto, 2007). As far as Malaysia is concerned, it relies solely on unemployment rate to measure the effectiveness of labour market. As mentioned earlier, the condition of full employment has been the highlights of the Tenth Malaysia Plan. Little attention has been given to what is happening in the labour market micro economically. As far as underemployment is concerned, the question arises whether the industries fully utilize labour force’s capacity both in terms of time and skill. This is the focus of the present study which aims to analyse whether underemployment is a big issue in Malaysia’s workforce by examining the pattern of time-related and skill-related underemployment in Malaysia. The study is significant in a sense that to

the best of our knowledge there is no research done on this topic in Malaysia. Therefore it will motivate others to undertake more details research on this topic in the future as well as the policy maker to take appropriate actions so as to solve problem.

2.0 DATA AND METHODOLOGY

The data used in this study are secondary data which are obtained from Department of Statistics Malaysia (DOSM). Most of the data can be accessed through their official website. Some unpublished data relevant to our study were collected through personal request. Data extracted from DOSM are based on Labour Force Survey and Malaysia Economic Statistics Time Series. DOSM website also has eDataBank, an electronic data bank where users may compile their own tables and graphs and export these tables in different formats. Among the relevant data extracted are:

- a) Gross Domestic Product (GDP),
- b) labour force,
- c) number of employed person,
- d) unemployment and unemployment rate based on gender,
- e) number of employees working less than 30 hours per week, and
- f) number of employees with diploma or degree working in semi-skilled occupation.

Time-related underemployment is measured in DOSM as the number of employees working less than 30 hours a week during the reference week. This definition is taken in this study to get an insight on time-related underemployment. To measure skill-related underemployment, the number of employees with diploma or degree working in semi-skilled occupation is analyzed based on 1-digit Malaysia Standard Classification of Occupations (MASCO). Semi-skilled occupation is categorized as MASCO 4 to 8 under the Malaysia Standard Classification of Occupation (MASCO) while the rest are skilled workers (1 to 3) and elementary workers (9). MASCO lists down the descriptions and tasks as well as the code for each position listed. It contains ten categories of major groups. Normally, Major Groups 2 to 9 take into account both education and skill levels in determining their classification. Jobs under categories 4 to 8 require only secondary or post-secondary education. Therefore, a person with a certificate higher than diploma is considered underemployed if he or she is employed in semi-skilled jobs.

The data available for time-related and skill-related underemployment is in terms of number of person affected. The proportion of underemployment over employment is calculated and expressed in terms of percentage using the following formula:

$$\frac{\text{Number of underemployed persons}}{\text{Number of persons employed}} \times 100$$

Time series data is taken for a period of 10 years' time from the year 2005 to 2015. However, some data (2005 to 2007) particularly data related to skill-related underemployment are not available. As such we use data over the periods 2008 to 2015.

There exist a wide range of forecasting methods in the literature. In this study, we utilize one of the simplest but popular forms of forecast methods called the basic exponential smoothing method to forecast the number of underemployment for 2016. Exponential smoothing uses a weighted average of past time series value as a forecast. In this study, only one weight is selected that is the weight for the most recent observation. The exponential smoothing equation is expressed as the following:

$$F_{t+1} = \alpha Y_t + (1 - \alpha)F_t \quad (1)$$

Where;

- F_{t+1} = Forecast of the time series for period $t+1$
- Y_t = Actual value of the time series on period t
- F_t = Forecast of the time series for period t
- α = Smoothing constant ($0 \leq \alpha \leq 1$)

In order to evaluate the forecasting accuracy, we have calculated the forecast errors as-

$$MAE = \frac{\sum_{t=1}^N |E_t|}{N}; \quad MSE = \frac{\sum_{t=1}^N E_t^2}{N}, \quad \text{and} \quad MAPE = 100 \times \frac{\sum_{t=1}^N \left| \frac{E_t}{Y_t} \right|}{N} \quad (2)$$

Where MAE is the Mean Absolute Error, MSE is the Mean Squared Errors and $MAPE$ is the Mean Absolute Percentage Errors. E is the forecast error at time t defined as $Y_t - F_t$. These are used more frequently to compare forecasting performance between different data sets.

3.0 RESULTS AND DISCUSSIONS

3.1 Trend of time-related underemployment by gender:

Trend of time-related underemployment by gender is depicted in figure 3.1 showing the number of person working less than 30 hours per week. The year 2013 recorded the highest number of

person affected by time-related underemployment which was 643,100. The lowest number of time-related underemployment was recorded in the year 2008, which were 470,700.

Figure 3.1: Time-related underemployment by gender (For data refer to Appendix)

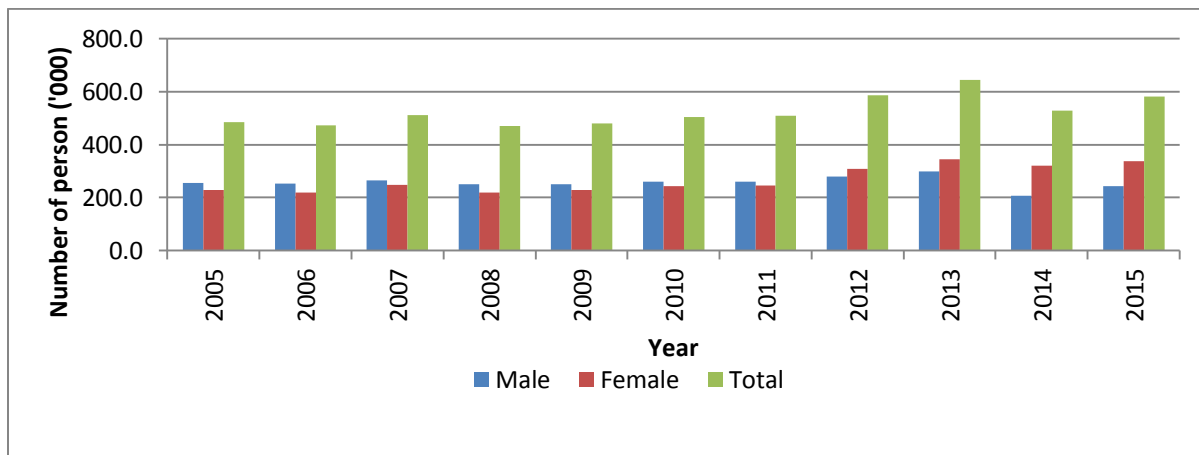
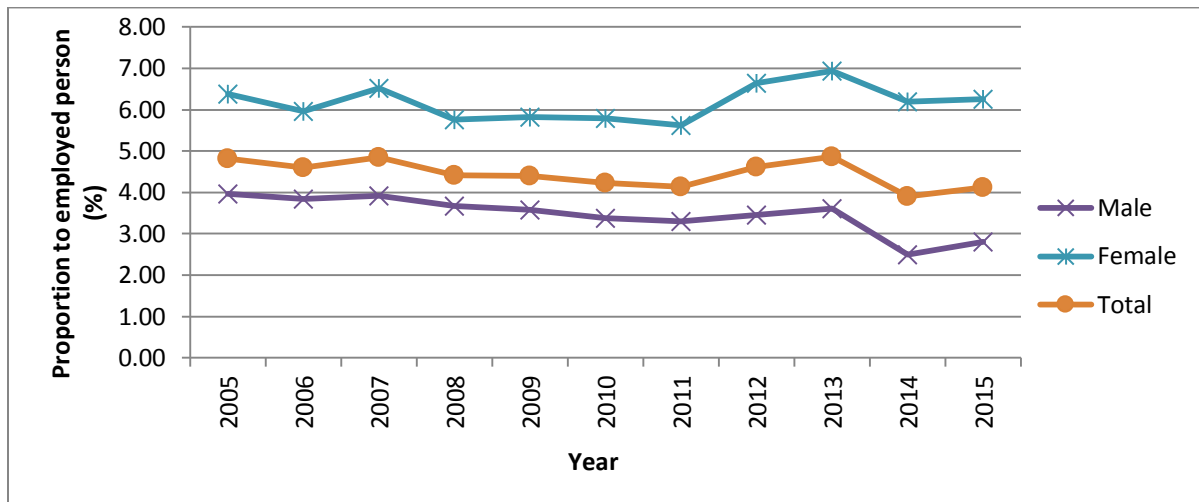


Figure 3.2 shows the percentage of employed person affected by time-related underemployment. In the year 2013, 4.87% of the employed was found to be underemployed, which was the highest proportion recorded. The number dropped in the following year, recording the lowest proportion of time-related underemployment at 3.91%. Although 2008 recorded the lowest number of time-related underemployment according to Figure 3.1, the percentage of employees underemployed was lowest in the year 2014. The percentage of time-related underemployment over employed person for the 10 period times was relatively stable ranging between 3.80 to 5.00%. From 2005 to 2011, number of males underemployed was higher than females. However, the proportion shows that time-related underemployment was more significant among females than males across the time periods. It shows that 6.94% of female employees were working below 30 hours in 2013 as compared to 3.62% of male employees.

Figure 3.2: Proportion of time-related underemployment to employed person



3.2 Trend of skill-related underemployment by gender: (For data refer to Appendix)

Figure 3.3 shows the number of person facing skill-related underemployment. The data for skill-related underemployment was only available starting from 2008 where 276,600 employees are found to be affected. The number however has shown increasing every year and reached to 682,500 in the year 2015.

Figure 3.3: Skill-related underemployment by gender

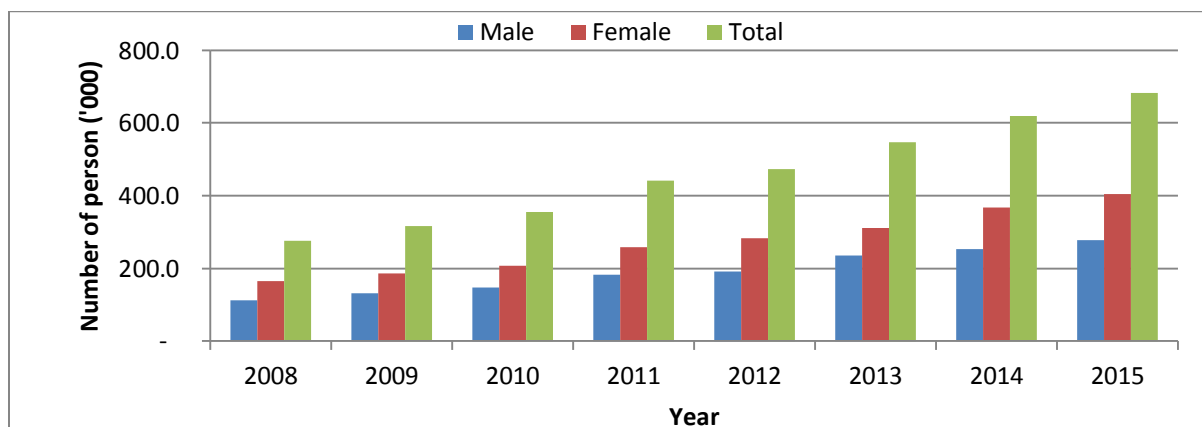
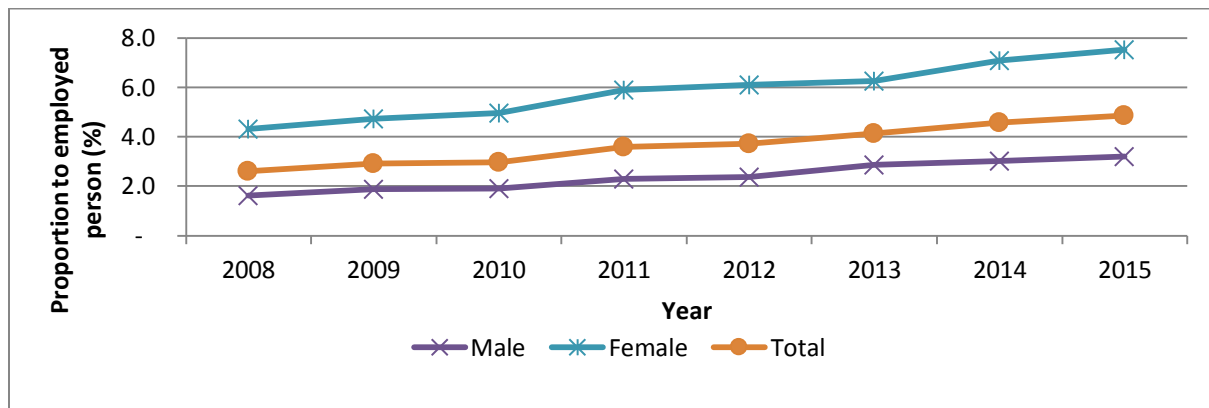


Figure 3.4 below shows the proportion of employees affected by skill-related underemployment. In 2008, only 2.60% employees are found to be underemployed in terms of skill and education. The percentage however found getting bigger and by the year 2015, 4.90% employees were

affected by skill-related underemployment. The numbers of female employees affected by skill-related underemployment are found to be significantly higher than male. The percentages of female underemployed were more than double of male. By the year 2015, 7.50% of female employees were found underemployed as compared to only 3.2% affected male employees.

Figure 3.4: Proportion of skill-related underemployment to employed person



3.3 Forecasting of time-related and skill-related underemployment for the year 2016:

3.3.1 Time-related underemployment

Table 3.1 below shows the forecasted (using equation 1) number of time-related underemployment with smoothing factor $\alpha = 0.3$. We tried different values for smoothing factor out of which $\alpha = 0.3$ appeared to be the best as it exhibits less error. Based on the exponential smoothing method, the forecast may predict that 558,700 employees are most likely to be affected by time-related underemployment in 2016.

Table 3.1 Exponential smoothing forecast with $\alpha = 0.3$ for time-related underemployment

| Year | Actual number of person ('000) | Forecasted number of person ('000) |
|------|--------------------------------|------------------------------------|
| 2005 | 484.4 | #N/A |
| 2006 | 471.9 | 484.4 |
| 2007 | 511.3 | 480.7 |
| 2008 | 470.7 | 489.9 |
| 2009 | 478.7 | 484.1 |
| 2010 | 503.0 | 482.5 |
| 2011 | 507.9 | 488.6 |
| 2012 | 587.0 | 494.4 |

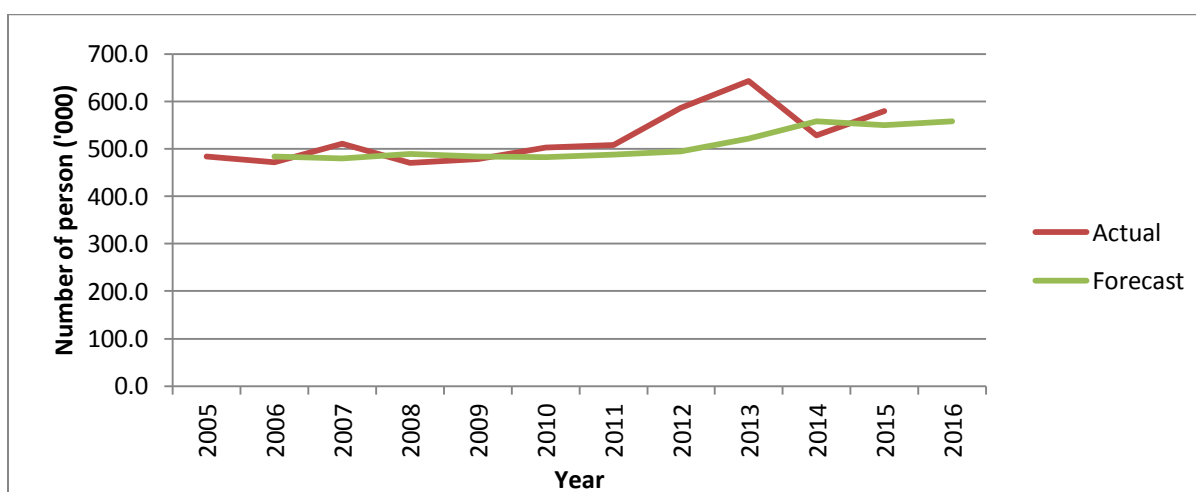
| | | |
|-------------|-------|-------|
| 2013 | 643.1 | 522.2 |
| 2014 | 529.0 | 558.5 |
| 2015 | 580.0 | 549.6 |
| 2016 | - | 558.7 |

The results of forecast errors (using equation 2) for time-related underemployment with smoothing constant $\alpha = 0.3$ are presented as follows:

| | | |
|------|---|--|
| MAE | = | Mean of the absolute value of forecast errors |
| | = | 38.08 (in '000) |
| MSE | = | Mean of the sum squared forecast errors |
| | = | 2726.51 (in'000) |
| MAPE | = | Mean of the absolute value of percentage forecast errors |
| | = | 6.71% |

Figure 3.5 exhibits the trend between actual and forecasted number of time-related underemployment with smoothing factor $\alpha = 0.3$

Figure 3.5: Actual and forecasted number of time-related underemployment



3.3.2 Skill-related underemployment

Table 3.2 below shows the forecasted (equation 1) number of skill-related underemployment with smoothing factor $\alpha = 0.9$. The forecasted value of persons to be most likely affected by time-related underemployment in 2016 is 625,700.

Table 3.2: Exponential smoothing forecast with $\alpha = 0.9$ for skill-related underemployment

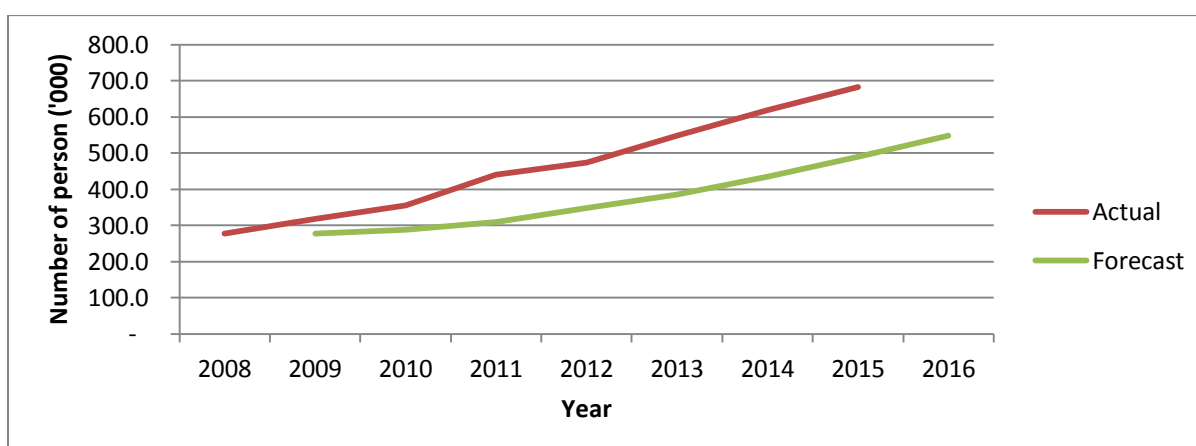
| Year | Actual number of person ('000) | Forecasted number of person ('000) |
|------|--------------------------------|------------------------------------|
| 2008 | 276.60 | #N/A |
| 2009 | 317.20 | 276.6 |
| 2010 | 354.60 | 313.1 |
| 2011 | 441.00 | 350.5 |
| 2012 | 473.90 | 431.9 |
| 2013 | 547.90 | 469.7 |
| 2014 | 619.50 | 540.1 |
| 2015 | 682.50 | 611.6 |
| 2016 | - | 625.7 |

The calculations of forecast errors (equation 2) for skill-related underemployment with smoothing constant $\alpha = 0.9$ are presented below:

| | | |
|------|---|--|
| MAE | = | Mean of the absolute value of forecast errors |
| | = | 63.30 (in '000) |
| MSE | = | Mean of the sum squared forecast errors |
| | = | 4397.26 (in'000) |
| MAPE | = | Mean of the absolute value of percentage forecast errors |
| | = | 13% |

Figure 3.6 below exhibits the trend between actual and forecasted number of skill-related underemployment with smoothing factor $\alpha = 0.9$

Figure 3.6: Actual and forecast amount of number of skill-related underemployment



The analysis revealed the fact that in Malaysia skill-related underemployment is increasing over years although unemployment rate is still below the natural rate of unemployment. An estimate of 625,700 employees is forecasted to be affected by skill-related underemployment in 2016. The analysis also revealed that in Malaysian labour market females are mostly affected by both time-related underemployment and skill-related underemployment. This finding is in line with the previous studies of Campbell et al. (2013), Li et al. (2015), Norshyahman (2015) and Wilkins (2004). As the Government of Malaysia projects the number of skilled workers to be comprised 35% of employees by 2020, the increased number of skill-related underemployment is going to pose a big challenge in the future. If the number of underemployment employees continues to grow, it will have negative effect both on the employees and on the economy. The employees will be deprived of getting better pay as they will not be able to utilize their potential ability at fullest extent. They may loss ability to update their skills which may downscale their lifestyle and forced them to remain in long term underemployment condition.

In other words, they will not be on the right career track. Underemployment on the other hand will affect the economy's gross domestic product negatively. This is due to the underutilization of human capital which will lead to produce less than the potential level and hence lower income. Low income means low consumption demand and hence slower economic growth as in the case of increased unemployment rate. To address this issue, the Government may focus on raising the wages of semi-skilled jobs or to identify the factors leading to skill-related underemployment in order to reduce the number. As far as the female underemployment problem is concerned, the Government aims to increase female participation in the workforce to 59% by 2020. However this effort should be hand in hand with providing or creating the job opportunities that match their capability and skills.

4.0 CONCLUSIONS

In this paper, we have analysed the trend of underemployment in Malaysia both from time-related and skill related underemployment perspective. The study found that in terms of number, time-related underemployment fluctuates between 470,700 and 643,100 during the ten years period. The number of skill-related underemployment is found trending upward by years. It was 276,600 in 2008 which increased by 405,900 to 682,500 in 2015. It is predicted that 625,700 employees are most likely to be affected in the year 2016. Female are found mostly affected by both time-related and skill-related underemployment. One of the limitations of this study is the possibility of overlap between time-related underemployment and skill-related underemployment. It is possible that an employee facing time-related underemployment is also suffering from skill-related underemployment. He or she may be working less than 30 hours a week; without fully utilising his/her skill and education attainment in the occupational world.

As such a deeper research on underemployment based on age cohort, industry, strata, field of study and educational attainment can be undertaken in order to get clear picture of the problem. It will help balancing the supply and demand of the labour force. On the other hand, data on field of study of employees affected by skill-related underemployment will facilitate the Government to identify the critical skills demanded by the industry and the creation of skilled jobs. Since the number of skill-related underemployment is increasing, it is also advisable to identify the factors leading to underemployment, especially among female employees.

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Appendix

| | Total Employment ('000) | | | Time-Related | | | Time-Related Underemployment | | |
|------|-------------------------|----------|----------|------------------------|-------|--------|-------------------------------|------|--------|
| | | | | Underemployment ('000) | | | as a % of Total Employment | | |
| Year | Total | Male | Female | Total | Male | Female | Total | Male | Female |
| 2005 | 10,045.30 | 6,470.50 | 3,574.80 | 484.4 | 256.5 | 227.8 | 4.82 | 3.96 | 6.37 |
| 2006 | 10,275.40 | 6,618.60 | 3,656.80 | 471.9 | 253.8 | 218.1 | 4.59 | 3.83 | 5.96 |
| 2007 | 10,538.10 | 6,747.10 | 3,791.00 | 511.3 | 264.3 | 247 | 4.85 | 3.92 | 6.52 |
| 2008 | 10,659.60 | 6,851.10 | 3,808.50 | 470.7 | 251.1 | 219.6 | 4.42 | 3.67 | 5.77 |
| 2009 | 10,897.30 | 6,955.70 | 3,941.60 | 478.7 | 249.4 | 229.3 | 4.39 | 3.59 | 5.82 |
| 2010 | 11,899.50 | 7,707.80 | 4,191.70 | 503 | 260.3 | 242.7 | 4.23 | 3.38 | 5.79 |
| 2011 | 12,284.50 | 7,889.80 | 4,394.70 | 507.9 | 261 | 246.8 | 4.13 | 3.31 | 5.62 |
| 2012 | 12,723.20 | 8,093.50 | 4,629.70 | 587 | 279.2 | 307.8 | 4.61 | 3.45 | 6.65 |
| 2013 | 13,210.10 | 8,237.50 | 4,972.60 | 643.1 | 297.9 | 345.2 | 4.87 | 3.62 | 6.94 |
| 2014 | 13,532.10 | 8,350.10 | 5,182.00 | 529 | 207.9 | 321.1 | 3.91 | 2.49 | 6.2 |
| 2015 | 14,067.80 | 8,691.10 | 5,376.70 | 580 | 243.8 | 336.2 | 4.12 | 2.81 | 6.25 |
| | | | | | | | | | |
| | Total Employment ('000) | | | Skill-Related | | | Skill-Related Underemployment | | |
| | | | | Underemployment ('000) | | | as a % of Total Employment | | |
| Year | Total | Male | Female | Total | Male | Female | Total | Male | Female |
| 2008 | 10,659.60 | 6,851.10 | 3,808.50 | 276.6 | 111.8 | 164.8 | 2.6 | 1.6 | 4.3 |
| 2009 | 10,897.30 | 6,955.70 | 3,941.60 | 317.2 | 130.8 | 186.4 | 2.9 | 1.9 | 4.7 |
| 2010 | 11,899.50 | 7,707.80 | 4,191.70 | 354.6 | 146.8 | 207.8 | 3 | 1.9 | 5 |
| 2011 | 12,284.50 | 7,889.80 | 4,394.70 | 441 | 182.1 | 258.9 | 3.6 | 2.3 | 5.9 |
| 2012 | 12,723.20 | 8,093.50 | 4,629.70 | 473.9 | 191.7 | 282.2 | 3.7 | 2.4 | 6.1 |
| 2013 | 13,210.10 | 8,237.50 | 4,972.60 | 547.9 | 236 | 311.9 | 4.1 | 2.9 | 6.3 |
| 2014 | 13,532.10 | 8,350.10 | 5,182.00 | 619.5 | 252.5 | 367 | 4.6 | 3 | 7.1 |
| 2015 | 14,067.80 | 8,691.10 | 5,376.70 | 682.5 | 277.8 | 404.7 | 4.9 | 3.2 | 7.5 |

Source: Department of Statistics, Malaysia